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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* REINER RAFFEL,  
JURGEN WIRTH, WOLFGANG PAWLIK, and  
MARTIN SCHAMBERG

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Appeal 2009-003492  
Application 10/656,346  
Technology Center 1700

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Decided: March 8, 2010

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Before TERRY J. OWENS, PETER F. KRATZ, and MARK NAGUMO,  
*Administrative Patent Judges.*

NAGUMO, *Administrative Patent Judge.*

DECISION ON APPEAL

A. Introduction<sup>1</sup>

Reiner Raffel, Jurgen Wirth, Wolfgang Pawlik, and Martin Schamberg (“Raffel”) timely appeal under 35 U.S.C. § 134(a) from the final rejection<sup>2</sup> of claims 1, 2, and 4-13, which are all of the pending claims. We have jurisdiction under 35 U.S.C. § 6. We REVERSE.

The subject matter on appeal relates to processes for making foamed polyurethanes. In such processes, according to the 346 Specification, a gas such as carbon dioxide is generated (e.g., by reaction of isocyanate groups with water) or also introduced and dissolved in the components in a mixing chamber. Depending on the gas content (also referred to as the “blowing agent”), temperature, and pressure, microbubbles will form and act as bubble nuclei, which will expand, producing the foamed polyurethane. According to the 346 Specification, prior art methods of making foamed polyurethanes result in less than optimal mixing of the components or to the non-uniform generation of bubble nuclei in the mixing unit. Although these problems can be overcome to some extent by mixing at higher pressures, coarser cells in the polyurethane foam are said to be generated. Alternatively, low loadings of bubble nucleating agents and low mixing chamber pressures may be used to obtain defect-free fine cells.

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<sup>1</sup> Application 10/656,346, *Process for the Production of Void-Free, Pinhole-Free Polyurethane Block Foam*, filed 5 September 2003, claiming the benefit under 35 U.S.C. § 119(a) of a German application filed 11 September 2002. The specification is referred to as the “346 Specification,” and is cited as “Spec.” The real party in interest is listed as Hennecke GmbH. (Appeal Brief, filed 28 April 2008 (“Br.”), 1.)

<sup>2</sup> Office action mailed 26 October 2007 (“Final Rejection”; cited as “FR”).

These problems are said to be overcome by spatially separating the mixing from the bubble nucleation. (Spec. 3, ll. 6-11.) More specifically, the components, including the blowing agent, are mixed at a pressure high enough that microbubbles do not form. (*Id.* at 5, ll. 5-14.) The mixed components are then moved to a lower pressure region, such that “targeted bubble nucleation” occurs. (*Id.* at 6, ll. 9-11.) The reduction in pressure is preferably effected abruptly by passing the mixture through a pressure-reduction body. (*Id.* at ll. 11-14.) A preferred pressure-reduction body is said to be a nozzle field of adjustable orifices. (*Id.* at 16-24.) The number of gas nuclei generated can be regulated by an adjustable throttle body downstream from the pressure reduction body. (*Id.* at ll. 24-29.) The pressure level between the pressure-reduction body and the throttle body is said to be up to 20 bar, most preferably in the range 0.2 to 5 bar. (*Id.* at 6, l. 29-7, l. 2.)

Representative Claims 1 and 10 are reproduced from the Claims Appendix to the Principal Brief on Appeal:

1. A process for the continuous production of polyurethane foam from at least one polyol component and at least one isocyanate component in the presence of water as a blowing agent and optionally further additives, comprising the steps of:

metering into a mixing chamber of a *static mixer* and mixing therein at pressures of from about 3 to about 200 bar to form a polyurethane reaction mixture, the at least one polyol component, the at least one isocyanate component, the water and optionally the further additives;

generating bubble nuclei in the polyurethane reaction mixture

*by atomization thereof in a pressure-reduction body* at pressures of from about 3 to about 200 bar, wherein the pressure is adjusted in the direction of flow downstream of the pressure-reduction body by a *throttle body*;

*causing the polyurethane reaction mixture containing bubble nuclei to flow out through the throttle body*; and

applying the polyurethane reaction mixture containing bubble nuclei to a substrate for foaming and curing.

(Claims App., Br. 8; paragraphing, indentation, and emphasis added.)

10. In an apparatus for the continuous production of polyurethane foam, comprising

a *static* mixer having

a mixing chamber and  
supply lines for the reaction components and  
a discharge opening for the polyurethane reaction mixture,

the improvement comprising

connecting a *pressure-reduction body* to the discharge opening and  
arranging an *adjustable throttle body* in the direction of flow *downstream* of the pressure-reduction body.

(Claims App., Br. 9; paragraphing, indentation, and emphasis added.)

The Examiner has maintained the following grounds of rejection:<sup>3</sup>

- A. Claims 1, 2, and 4-13 stand rejected under 35 U.S.C. § 102(b) in view of Althausen.<sup>4</sup>
- B. Claims 1, 2, and 4-13 stand rejected under 35 U.S.C. § 103(a) in view of Althausen.
- C. Claims 10-13 stand rejected under 35 U.S.C. § 103(a) in view of the combined teachings of Rill<sup>5</sup> and Sulzbach 919.<sup>6</sup>
- D. Claims 1, 2, and 4-13 stand rejected under obviousness-type double patenting in view of Sulzbach 124.<sup>7</sup>

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<sup>3</sup> Examiner's Answer mailed 30 June 2008. ("Ans."). Rejections for anticipation and for obviousness in view of each of Sulzbach 919 and U.S. Patent 5,643,970 to Sulzbach, taken alone, have been withdrawn. (Ans. 3.)

<sup>4</sup> Ferdinand Althausen et al., *Process and Device for Producing Foam Using Carbon Dioxide Dissolved Under Pressure*, U.S. Patent 5,840,778 (1998) ("Althausen"). Althausen is assigned in part to Hennecke, the real-party-in interest of the application on appeal, and shares Reiner Raffel as a common inventor with the 346 Application.

<sup>5</sup> John C. Rill and Paul F. Shaeffer, *Froth Generator*, U.S. Patent 3,220,801 (1965).

<sup>6</sup> Hans-Michael Sulzbach et al., *Process for Foam Production Using Carbon Dioxide Dissolved under Pressure*, U.S. Patent 6,019,919 (2000) ("Sulzbach 919"). Sulzbach 919 is assigned in part to Hennecke, the real-party-in interest of the application on appeal, and shares Reiner Raffel as a common inventor with the 346 Application.

<sup>7</sup> Hans-Michael Sulzbach et al., *Method for the Production Block Foam*, U.S. Patent 6,809,124 B2 (2004) ("Sulzbach 124"), based on an international application accorded an effective filing date of 13 December 2002. Sulzbach 124 is assigned to Hennecke, the real-party-in interest of the application on appeal, and shares Reiner Raffel and Martin Schamberg as common inventors with the 346 Application.

Raffel contends the Examiner erred in finding that Althausen describes or would have rendered obvious: (a) metering individual reaction components into a static mixer; (b) using a pressure reducing body followed by a throttle body; and (c) (with respect to claim 10) using an adjustable throttle body. (Br. 4-6) Similarly, Raffel argues that the rejection of claims 10-13 over the combined teachings of Rill (for metering components) and Sulzbach 919 (identical to Althausen, as relied on by the Examiner), are faulty for the same reasons. (Br. 6.)

As for the obviousness-type double patenting rejection, Raffel denies that there is any suggestion to replace pin mixer 1 (which is used to mix all the components of the polyurethane-forming precursors) with static mixer 23 (which is used to premix CO<sub>2</sub> and the polyol precursor).<sup>8</sup> ((Br. 6.)

## B. Discussion

Findings of fact throughout this Opinion are supported by a preponderance of the evidence of record.

As the Appellant, Raffel bears the procedural burden of showing harmful error in the Examiner's rejections. *See, e.g., Shinseki v. Sanders*, 129 S.Ct. 1696, 1706 (2009):

it is clear that the burden of showing that the error is harmful normally falls upon the party attacking the agency's determination. . . . To say that the claimant has the 'burden' of showing that an error was harmful is not to impose a complex system of 'burden shifting' rules or a particularly

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<sup>8</sup> For clarity, labels of components are reproduced in bold font regardless of their presentation in the original references.

onerous requirement. . . .the party seeking reversal normally must explain why the erroneous ruling caused harm.

*See also, In re Chapman*, 2010 WL 638277, at \*6 (Fed. Cir. 2010), citing *Sanders* as well as Federal Circuit precedent. In parallel with appeals to the Federal Circuit, an appellant to the Board of Patent Appeals and Interferences must show error in the Examiner's rejections. The necessity of such a showing is emphasized by the court's rulings that a failure to raise arguments to the Board results in waiver of such arguments before the court. *In re Hyatt*, 211 F.3d 1367, 1373 (Fed. Cir. 2000).

Anticipation requires that every element of the claimed invention be identically shown in a single reference, arranged as in the claim under review. *In re Bond*, 910 F.2d, 831, 832-33 (1990), and cases cited therein. Here, the claims and the weight of the evidence of record solidly support Raffel on all but the first point.

Claim 1 requires metering the various recited components into a static mixing chamber. However, the plain language of claim 1 does not require that the components be introduced individually into the mixer. Indeed, the 346 Specification teaches that various possible combinations of streams are possible.

[t]he water and optionally the additives may be conveyed into the mixing chamber as separate streams, or they may first be introduced in whole or in part into the at least one polyol component and/or the at least one isocyanate component and mixed therewith, and *then* be conveyed into the mixing chamber together with the latter at least one polyol component and/or the at least one isocyanate component.



(Spec. 4, ll. 10-14; emphasis added.) Reading claim 1 broadly, in light of the supporting disclosure, we reject Raffel's contention that individual components must be metered.

The remaining contested points stand differently. In this appeal, the Examiner has not directed our attention to disclosure in Althausen of a static mixer for all the components of the polyurethane. Nor has the Examiner come forward with an explanation supported by credible evidence of record that a person having ordinary skill in the art would have considered the teaching of a static mixer for the mutually non-reactive polyol and CO<sub>2</sub> to be a teaching that all of the reactive components for the polyurethane could be mixed with a static mixer rather than the stirred mixer 40 shown in Althausen Figure 7. Although 35 U.S.C. § 102(b) requires a description, not an embodiment or working example, the mere possibility that something could have been done does not suffice to prove anticipation.

Moreover, as Raffel argues, the Examiner has not directed our attention to credible evidence that Althausen describes a pressure reduction body and a throttle body downstream of the pressure reduction body, arranged as required by claims 1 and 10, or that function as required by claim 10. In other words, the Examiner has not indicated a structure in which bubble nuclei are generated in the polyurethane reaction mixture, or a second structure further downstream that adjusts the pressure in the first structure, and through which second structure the reaction mixture containing the bubble nuclei flow. The Examiner has not raised issues regarding anticipation of any dependent claims that cure these errors.

Either of these errors suffice to REVERSE the rejection for anticipation.

The Examiner has not explained why these differences from the claimed process or apparatus would have been obvious, either based on the teachings of Althausen alone, or based on the combination of the teachings of Rill, on which the Examiner relies for metering, with Sulzbach 919, which is essentially identical, in the parts relied on by the Examiner, to Althausen. We decline the Examiner's invitation to "see the entire document [of Rill]" to confirm that mixing elements, valves, and nozzles are "arranged as claimed by applicants" (FR 7; Ans 6), particularly when the Examiner admits that Rill does not describe a static mixer for all of the components. (*Id.*) Our role is review of findings and conclusions, not fact-finding *de novo*. The Examiner's analysis of Sulzbach 919 regarding mixers is faulty for the reasons given supra regarding Althausen. Accordingly, we REVERSE the rejections for obviousness.

Finally, the Examiner has not satisfactorily explained why the subject matter claimed in Sulzbach 124, or the supporting disclosure, would have led a person having ordinary skill in the art to substitute the static mixer 23, which is used to mix polyol with CO<sub>2</sub> for the disclosed stirred ("pin") mixer. Obviousness is a legal conclusion based on findings of fact. Both the requisite fact-findings and analysis are lacking. We therefore REVERSE the rejection for obviousness-type double patenting.

D. Order

We REVERSE the rejection of claims 1, 2, and 4-13 under 35 U.S.C. § 102(b) in view of Althausen.

We REVERSE the rejection of claims 1, 2, and 4-13 under 35 U.S.C. § 103(a) in view of Althausen.

We REVERSE the rejection of claims 10-13 under 35 U.S.C. § 103(a) in view of the combined teachings of Rill and Sulzbach 919.

We REVERSE the rejection of claims 1, 2, and 4-13 under obviousness-type double patenting in view of Sulzbach 124.

REVERSED

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